CLAIMS

We Claim:

1. A microfluidic device, comprising:

a substrate comprising at least first and second blocks that are configured to slide relative to each another;

at least one reaction channel defined on the first block along which the sample migrates;

at least one sample channel defined on the first block;

at least one sample metering channel defined on the second block;

sliding means for sliding the second block relatively to the first block from a first position at which sample is loaded from the sample channel into the sample metering channel, to a second position at which sample is introduced from the sample metering channel to the reaction channel.

2. A microfluidic device as in claim 1, wherein the first block comprises a sample reservoir in a first section and a waste reservoir in a second section, wherein the second block slides between the first and second sections, with the sample metering channel in fluid communication with the sample reservoir and waste reservoir at the first position.

3. A microfluidic device as in claim 2, wherein the first block further comprises a first buffer reservoir in the first section and a second buffer reservoir in the second section, wherein at least one of the first and second buffer reservoirs is in fluid communication with the sample metering channel at the second position.

4. A microfluidic device as in claim 3, wherein the second block further comprises at least one auxiliary channel, wherein the auxiliary channel is aligned in fluid communication with at least one of the first and second buffer reservoir at the first position.

5. A microfluidic device as in claim 2, wherein the first and second sections of the first block are in separate pieces slidable relative to the second block.

6. A microfluidic device as in claim 5, wherein the first section of the first block moves with the second block when the second block slides from the first position to the second position.

7. A microfluidic device as in claim 6, wherein the first section of the first block slides relative to the second block to align the first and second buffer reservoir in fluid communication with the sample metering channel at the second position of the second block.

8. A microfluidic device as in claim 1, wherein the second block comprises at least one of a sample reservoir and waste reservoir in fluid communication with the sample metering channel, and the first block comprises at least one of a waste reservoir and sample reservoir complementary to said at least one of a sample reservoir and waste reservoir in the second block in fluid communication with the sample channel, wherein when the second block is at the first position, the sample reservoir, waste reservoir, sample channel and sample metering channel are aligned in fluid communication.

9. A microfluidic device as in claim 1, wherein the second block comprises first and second sample metering channels, wherein the second sample metering channel is positioned to permit sample loading from the sample channel to the second sample metering channel while sample is being introduced from the first sample metering channel to the reaction channel at the second position.

10. A microfluidic device as in claim 1, wherein the sample metering channel has two ends on a side of the second block that slides relative to the first block; and wherein the two ends of the sample metering channel are align in fluid communication with the sample channel at the first position, and with the reaction channel at the second position.

11. A microfluidic device as in claim 1, wherein there are a plurality of reaction channels, and wherein one end of the plurality of channels terminate at a same reservoir.

12. A microfluidic device as in claim 1, further comprising means for biasing the first and second blocks against each other in a slidable relationship.

13. A microfluidic device, comprising:

a substrate comprising at least first and second blocks that are configured to slide relative to each another;

at least one reaction channel defined on the first block along which the sample migrates;

at least one sample channel defined on the first block;

at least one sample metering channel defined on the first block;

at least one waste reservoir on the second block;

sliding means for sliding the second block relatively to the first block from a first position at which sample is loaded from the sample channel into the sample metering channel with excess discharged to the waste reservoir in the second block, to a second position at which sample is introduced from the sample metering channel to the reaction channel.

14. A method for injecting sample into a reaction channel defined on a microfluidic device, comprising the steps of:

providing a substrate comprising at least first and second blocks that are configured to slide relative to each another;

defining at least one reaction channel on the first block along which the sample migrates;

defining at least one sample channel on the first block;

defining at least one sample metering channel on the second block;

sliding the second block relatively to the first block from a first position at which sample is loaded from the sample channel into the sample metering channel, to a second position at which sample is introduced from the sample metering channel to the reaction channel.